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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,724	10/25/2001	Ruben P. Madrid	TI-27987	2847
23494	7590	05/28/2004	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			MALDONADO, JULIO J	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/002,724

Applicant(s)

MADRID ET AL.

Examiner

Julio J. Maldonado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4, 5, 7, 8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Exposito et al. (U.S. 6,087,202) in view of Glenn et al. (U.S. 2002/0168798 A1).

In reference to claims 1 and 8, Exposito et al. (Figs.1-9) in a related method to form a plurality of ball grid array teach providing a plurality of chips (103); coupling the chips (103) to a first side of a substrate (102); attaching a plurality of solder balls (107) to a second side of the substrate (102); and cutting the substrate to produce the ball grid array (column 2, line 35 – column 3, line 53).

Exposito et al. fail to teach the plurality of chips comprise ~~fl~~ flip chips. However, Glenn et al. (Figs.1, 2 and 20-22) in a related method to form a plurality of ball grid array packages teaches providing a plurality of flip chips (10A); and coupling the flip chips (10A) to a first side of a substrate (12) ([0053], [0111] – [0115] and [0131]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Exposito et al. and Glenn et al. to enable forming the chips of Exposito et al. as taught by Glenn et al.

In reference to claims 4 and 10, the combined teachings of Exposito et al. and Glenn et al. teach wherein coupling the flip chip to the first side of the substrate comprises soldering a plurality of solder bumps coupled to the flip chip to a plurality of solder pads on the first side of the substrate (Glenn et al., [0114]).

In reference to claims 5 and 11, the combined teachings of Exposito and Glenn et al. teach wherein encapsulating the flip chip with the molding comprises encapsulating the flip chip by utilizing a transfer molding process (Glenn et al., [0131]).

In reference to claim 7, the combined teachings of Exposito et al. and Glenn et al. teach wherein cutting the substrate comprises cutting the substrate in a first direction; and after cutting the substrate in the first direction cutting the substrate in a second direction substantially perpendicular to the first direction (Exposito et al., Figs.7 and 9).

3. Claims 2, 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Exposito et al. (U.S. 6,087,202) in view of Glenn et al. (U.S. 2002/0168798 A1) as applied to claims 1, 4, 5, 7, 8, 10 and 11, above, and further in view of Glenn et al. (U.S. 6,309,943 B1).

The combined teachings of Exposito et al. and Glenn et al. substantially teach all aspects of the invention teach wherein the plurality of flip chips comprises forming a plurality of integrated circuit dies on a wafer, and coupling a plurality of solder bumps to the integrated circuit dies (Exposito, Fig.8, column 1, lines 14 – 21, and column 3, lines 43 – 46). The combined teachings of Exposito et al. and Glenn et al. fail to teach scribing the wafer to define edges of the flip chip; and transferring the ball grid array

package to a shipping tray. However, Glenn et al. (Fig.1) in a related method form a packaging structure teach a wafer (10) with integrated circuits (12), and scribing the wafer (10) to define edges of the circuit array (column 1, lines 15 – 25). Glenn et al. also teach (in Fig.9) after forming the packaging structure, transferring said structure to a shipping tray (column 12, lines 36 – 46). Therefore, it would have been obvious to combine the teachings of Glenn et al. with the teachings of Exposito et al. and Glenn et al. to enable scribe lines on the wafer to define edges of the flip chip, and transferring the ball grid array to a shipping tray as taught by Glenn et al.

4. Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Exposito et al. (U.S. 6,087,202) in view of Glenn et al. (U.S. 2002/0168798 A1) as applied to claims 1, 4, 5, 7, 8, 10 and 11, above, and further in view of Tani et al. (U.S. 6,410,363 B1).

Exposito et al. in combination with Glenn et al. substantially teach all aspects of the invention but fail to teach wherein encapsulating the flip chip with the molding comprises encapsulating the flip chip with an epoxy. However, Tani et al. in a related method to form a package structure teach a conventional encapsulating process including encapsulating a chip with a molding comprising an epoxy (column 1, lines 30 – 45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Exposito et al. and Glenn et al. with the teachings of Tani et al. to enable using epoxy in the embodiment as taught by Exposito et al. and Glenn et al. as taught by Tani et al.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Exposito et al. (U.S. 6,087,202) in view of Glenn et al. (U.S. 2002/0168798 A1) as applied to claims 1, 4, 5, 7, 8, 10 and 11, above, and further in view of Akram et al. (U.S. 6,423,616 B2).

The combined teachings of Exposito et al. and Glenn et al. substantially teach all aspects of the invention but fail to show cutting the substrate in a first direction with a plurality of cutting blades; rotating the substrate substantially 90 degrees with respect to the cutting blades; and cutting the substrate in a second direction substantially 90 degrees to the first direction. However, Akram et al. (Figs.3-5) in a related method to singularize a plurality of semiconductor chip form a substrate teach cutting said substrate (52) in a first direction with a plurality of cutting blades (32, 34); rotating a substrate (52) substantially 90 degrees with respect to the cutting blades (32, 34); and cutting the substrate (52) in a second direction substantially 90 degrees to the first direction (column 4, line 10 – column 5, line 40). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Exposito et al. and Glenn et al. with the teachings of Akram et al. to enable cutting the substrate of Exposito et al. and Glenn et al. as taught by Akram et al., and furthermore, since this would increase the speed of cutting the substrate (column 3, lines 1 – 3).

Response to Arguments

6. Applicant's arguments filed 03/15/2004 have been fully considered but they are not persuasive.

Applicants argue, "...the Glenn et al. (U.S. 2002/0168798 A1) reference is not prior art. Applicants have claimed benefit of provisional application 60/257,939, which was filed on December 21, 2000. Glenn's U.S. filing date is May 17, 2002. Therefore applicants respectfully submit that the rejections of claims 1- 13 are improper...". In response to this argument, Glenn et al. (U.S. 2002/0168798 A1) is a division of application 09/585,901 filed on June 2, 2000, which is a division of application No.09/083,524, filed on May 22, 1998 (Glenn et al., front page). Therefore, the rejection of claims 1-13 is proper.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is 571-272-2800. See MPEP 203.08.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 306-3329.

Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado
Patent Examiner
Art Unit 2823

Julio J. Maldonado
May 24, 2004


George Fourson
Primary Examiner